

**Management Measures of Shenzhen Institute of Advanced
Technology, Chinese Academy of Sciences
on Laboratory Hazardous Chemicals**

Chapter 1 General

Article 1 In order to strengthen the safety management of hazardous chemicals to ensure the safety of employees' lives, health, scientific research environment, and property, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (SIAT) has formulated these Measures in accordance with the *Regulations on the Safety Management of Hazardous Chemicals*, *Regulations on the Management of Precursor Chemicals*, and *Regulations on Labor Protection in Workplaces Using Toxic Substances*. All units affiliated with SIAT must comply with and strictly follow these regulations.

Article 2 Hazardous chemicals include:

1. Highly toxic drugs: cyanides, arsenides, alkaloids, etc.
2. Radioactive drugs: uranium, cobalt-60, etc.
3. Corrosive drugs: strong acids, strong alkalis, bromine, formaldehyde, sodium hydroxide, etc.
4. Explosive drugs and oxidants that can form explosive mixtures or cause combustion: potassium acid, sodium chlorate, nitric acid, sodium peroxide, potassium nitrate, etc.
5. Flammable and combustible gases: hydrogen, acetylene, coal gas, oxygen, etc.
6. Flammable, self-igniting, and water-reactive solids: red phosphorus, yellow phosphorus, discarded film, potassium, sodium, calcium carbide, etc.
7. Flammable liquids with flashpoints at or below 45°C: ether, gasoline, carbon disulfide, acetone, benzene, ethanol, propanol, etc.
8. Precursor chemicals: toluene, acetone, ether, hydrochloric acid, sulfuric acid, pyridine, etc.

Article 3 Responsibilities of the Laboratory Safety Functional Management Department:

The Laboratory Safety Functional Management Department of SIAT is responsible for inspecting and supervising the management of chemicals, managing chemical warehouses and disposal of waste chemicals. The Hazardous Chemical Procurement Functional Department is responsible for chemical procurement and obtaining safety data for chemicals. Departments and institutes are responsible for the safety management of hazardous chemicals in their laboratories and appoint specific personnel for daily management;

Chapter 2 Procurement and Transportation

Article 4 Hazardous chemicals shall be purchased according to the needs of laboratory work to minimize inventory

Article 5 Strict control over the procurement of hazardous chemicals is required. Procurement of explosive and precursor chemicals requires procurement permits from the competent administrative department or public security organs, following the requirements of the *Regulations on the Management of Precursor Chemicals*, *Management Measures for the Security of Precursor Hazardous Chemicals*, and *Management Measures for the Procurement and Road Transportation Permits for Highly Toxic Chemicals*. Procurement shall be centralized by the Hazardous Chemical Procurement Functional Department.

Article 6 The entire process of verification, approval, and arrival of purchased items must be documented with complete purchase approval forms, storeroom requisition forms, and hazardous chemical records, which shall be reported to the Laboratory Safety Functional Management Department.

Chapter 3 Storage, Use, and Disposal

Article 7 Hazardous chemicals shall be stored in dedicated warehouses, designated areas, or dedicated storage rooms and shall not be stored outdoors. Hazardous chemicals stored in laboratories shall be stored in safety cabinets. Storage methods, procedures, and quantities must comply with national standards and be managed by designated personnel. Maintain a temperature of around 22°C, ensure proper ventilation systems, equip with firefighting equipment and protective gear, strictly prohibit smoking, and eliminate all potential sources of sparks.

Article 8 Hazardous chemicals shall be categorized and stored separately, and storage locations and quantities shall be appropriate. Entry and exit of hazardous chemicals must be registered and checked, and storeroom entry and exit registration must be properly documented.

Article 9 Hazardous chemicals shall be stored separately. Reagents stored in storage rooms shall not be stacked too high or too densely, and the maximum reserve quota shall be limited (it is recommended the on-site storage amount for 3 days). Overstocking shall be avoided, incompatible substances shall not be mixed, and hazardous chemicals stored in excess on-site shall be promptly returned to the hazardous chemical warehouse.

Article 10 Each laboratory shall conduct regular inspections of the quantity of hazardous chemicals stored and the safety facilities. Each laboratory shall compile safety data sheets (SDS) for the hazardous chemicals used for easy reference. Custodians shall be familiar with the safety data and emergency procedures for hazardous chemicals based on the SDS, conduct daily inspections, and record them in the *Daily Inspection Form for Hazardous Chemicals*. Any problems discovered shall be promptly addressed.

Article 11 Containers and packaging of hazardous chemicals must be produced by designated professional enterprises and pass inspection before use. Empty containers of hazardous chemicals and those containing residual hazardous chemicals shall be recycled by the supplier as much as possible. Containers of hazardous chemicals must be clearly labeled with tags indicating their contents and hazards. Flammable, explosive, and precursor chemicals must indicate their content and hazards, and they must be stored separately and properly secured. Safety labels for

self-prepared hazardous chemical reagents shall include information such as the composition and hazards of the reagent. The "Hazards" column shall briefly describe the hazardous characteristics of the reagent, such as "flammable, explosive, toxic, corrosive". If the hazard is unknown, it shall be labeled "Hazard Unknown, Please Handle with Care".

Article 12 Containers used to hold hazardous chemicals, such as those used to contain hazardous waste liquid, must be inspected before use to eliminate potential hazards and prevent accidents such as leaks, explosions, fires, poisoning, and pollution.

Article 13 User departments and personnel responsible for hazardous chemicals must comply with safety regulations and operating instructions, and must be familiar with the correct use methods and emergency measures. Laboratory operators shall wear protective equipment according to operating procedures, and operations involving use and sub-package of flammable, explosive, toxic, and harmful hazardous chemicals shall be carried out in fume hoods or well-ventilated environments. Experiments generating toxic and harmful waste shall be conducted in fume hoods.

Article 14 Highly toxic chemicals must be stored separately in dedicated warehouses or safes, and operations must be conducted indoors or in ventilated environments. Management practices such as "dual-person receipt, dual-person use, dual-locking, and dual-accounting" shall be implemented and the records of flow, storage, and use of highly toxic chemicals shall be kept truthfully.

Article 15 Containers, waste liquids, residues, etc., of highly toxic chemicals shall be promptly and properly disposed of. Random dumping is strictly prohibited, and individuals responsible for such actions shall bear full responsibility for any serious consequences.

Article 16 Laboratories storing and using hazardous chemicals shall establish entry and exit and use ledgers for laboratory chemicals. Separate registration ledgers shall be established for the use of precursor (explosive) chemicals. Records in the ledgers must be clear and accurate.

Article 17 Safety officers in laboratories shall regularly inspect and clean chemicals stored in laboratories and maintain records. If expired or deteriorated chemicals are found, contact the safety functional management department for proper disposal.

Chapter 4 Contingency Plan of Accidents

Article 18 Storerooms for hazardous chemicals must strictly prohibit smoking and the use of mobile phones, and must be equipped with fire-fighting equipment. In case of fire or flooding, the power supply shall be cut off first, and alarms shall be raised, and on-site self-rescue shall be organized. In critical situations, personnel shall be evacuated quickly and timely.

Article 19 In the event of theft of hazardous chemicals, laboratory head and the hazardous chemical safety competent department shall be informed, and the police shall be notified promptly to assist in the investigation.

Article 20 In the event of a hazardous chemical accident, the scene must be protected, and the laboratory head and the hazardous chemical safety competent department must be notified immediately. Relevant government authorities shall be informed, and if necessary, personnel entering the accident site shall wear gas masks. Under the supervision of security personnel, hazardous chemicals shall be cleaned up, and reports shall be prepared on the losses and residues, which shall be submitted to the relevant departments for identification and processing.

Article 21 Laboratories shall develop on-site disposal plans for hazardous chemical accidents based on the characteristics of hazardous chemicals, laboratory activities, and accident risks. Laboratories shall regularly organize drills for on-site disposal plans for hazardous chemical accidents.

Chapter 5 Miscellaneous

Article 22 In addition to participating in safety training provided by SIAT, laboratory head shall provide safety education to relevant personnel using hazardous chemicals to ensure that the laboratory has necessary safety precautions.

Article 23 The safety functional management department has the authority to guide and inspect the storage and management of hazardous chemicals.

Article 24 Depending on the severity of the violation of these Measures, individuals may be punished accordingly, and criminal acts will be prosecuted by judicial authorities in accordance with the law.

Article 25 For matters not covered by these Measures, the national *Regulations on the Safety Management of Hazardous Chemicals* shall apply.

Article 26 These Measures are interpreted by the Department of Public Service Platform for Science and Technology and shall be implemented from the date of promulgation. The original *Management System of Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences on Hazardous Chemicals* (SYK ZI [2019] No. 108) shall be repealed simultaneously.

Attachment 2: Application Form for Requisition of Storeroom Hazardous Chemical Reagents

Hazardous Chemicals Requisition Application Form

Commitment Letter for the Use of Hazardous Chemicals

① The center director, laboratory head, and recipient hereby commit that all hazardous chemicals acquired will only be used for legal scientific research experiments, solely within this laboratory, and will not be taken outside, sold, or borrowed.

② The laboratory pledges to properly store hazardous chemicals, placing them in designated cabinets of hazardous chemicals and locking up precursor chemicals or explosive chemical reagents. In case of loss or theft, immediate reporting to the competent department and property management is required.

③ Waste liquids from experiments shall be collected in waste barrels and must not be poured into drains. Waste liquids shall be classified, including organic solvent waste, acid waste, alkaline waste, oil waste, etc. If certain laboratories have special waste liquids, such as heavy metals, they shall be clearly marked. Glass bottles shall be collected and stored centrally in cardboard boxes. Deliver to

Outdoor waste storage cabinet on the west side of Building E1, ground floor (open every Tuesday and Thursday from 15:00 to 16:00).

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Department Name		Center Name		Applicant		<input type="checkbox"/> Employee <input type="checkbox"/> Student
Purpose of Requisition:	Stored Laboratory:	Central Project No. (Starting with Y or E) (Important, Required Field):				
Item Name	Brand/Grade	Specification	Quantity Requested (Bottles)	Remaining Quantity in Laboratory before		

				Requisition (Bottles)

Center Director (Signature):

Date:

Project Leader (Signature):

Date:

Recipient (Signature) (To be signed upon receipt, no Date:
advance signatures allowed):

The signatures of the center director and project leader are required for the

requisition of precursor chemicals or explosive hazardous chemicals. The signature of the project leader is required for the requisition of non-precursor chemicals or non-explosive chemical reagents. Except for signatures, printing is mandatory; handwritten or altered entries are invalid.

Attachment 3

Common Precursor Chemical Reagents Used in SIAT:

Acetone, toluene, trichloromethane, ether, sulfuric acid, hydrochloric acid, potassium permanganate, butanone, phenylacetic acid, acetic anhydride, piperidine

Common Explosive Chemical Reagents Used in SIAT:

Nitric acid and nitrates, hydrogen peroxide, peroxides and superoxides, perchloric acid, perchlorates and chlorates, sulfur, active metal elements such as sodium and potassium

Details of Hazardous Chemicals Temporary Storage Cabinet

SN	Name	Specification	Brand Purity	Price	SN	Name	Specification	Brand Purity	Price
01	Anhydrous ethanol AR	500ML,5L,20kg	SHANGLIN G/HUSHI	16,136,780	16	Hydrochloric acid	500ML	Dongjiang AR	34
02	Medical alcohol	500ML,5L	Ante	13,98	17	Sulfuric acid	500ML	Dongjiang AR	36
03	Silver nitrate	100g	SHANGLIN GAR	1230	18	Nitric acid	500ML	SHANGLING AR	68
04	Petroleum ether 60-90	500ML,5L	SHANGLIN GAR	25,136	19	Toluene	500ML	SHANGLING AR	78
05	75% bulk alcohol	20KG	Shenzhen Huashi	395	20	Piperidine	100ML	SHANGLING AR	286
06	95% bulk alcohol	20KG	Shenzhen Huashi	395	21	Xylene	500ML	SHANGLING AR	32
07	Anhydrous methanol	500ML,5L	SHANGLIN GAR	22,145	22	Ether	500ML	SHANGLING AR	65
08	Butanone	500ML	SHANGLIN GAR	68	23	Dimethylformamide	500ML	SHANGLING AR	54
09	Triethanol amine	500ML	SHANGLIN GAR	120	24	Dichloromethane	500ML, 5L	SHANGLING AR	33,145
10	Isopropanol	500ML,5L	Dongjiang AR	45,320	25	Glacial acetic acid	500ML	SHANGLING AR	28
11	Acetone	500ML,5L	SHANGLIN GAR	65,530	26	Trichloromethane	500ML	SHANGLING AR	110
12	Normal	500ML,5L	SHAN	35,168	27	Cyclohexane	500ML	SHANGLI	56

	hexane		GLIN G AR			ane		NG AR	
13	Isoflurane	100ML	Isoflurane (Yifuning)	168	28	Ammonia solution	500ML	SHANGLI NG AR	16
14	Hydrogen peroxide	500ML	SHAN GLIN G AR	68	29	Acetic oxide	500ml	SHANGLI NG AR	370
15	Potassium permanganate	500g	SHAN GLIN G AR	240	30	Ethyl acetate	500ml,5L	SHANGLI NG AR	23, 125
31	Tetrahydro furan	500ml,5L	SHAN GLIN GAR	52,480	32	Sodium hydroxide , flake	500g	SHANGLI NG AR	15
33	Potassium hydroxide	500g	SHAN GLIN G, AR	24	34	Acetonitri le	500ml,5L	SHANGLI NG AR	49,480
35	Dimethyl sulfoxide	AR500ml	SHAN GLIN G	47	36	N-butyl alcohol	500ml	SHANGLI NG AR	46
37	Normal pentane	AR500ml	SHAN GLIN	97	38	Hydroflu oric acid	AR500ml	SHANGLI NG	64

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39	Isopentane	AR500ml	SHANGLING	97	40	Sodium borohydride	AR100g	SHANGLING	460
41	Bromine, granules	AR500g	SHANGLING	1060	42	Phosphoric acid	AR500ml	SHANGLING	34
43	Hydrazine hydrate	AR500ml	SHANGLING	368	44	N-Methyl pyrrolidone	AR500ml	SHANGLING	65
45	Boric acid	AR500g	SHANGLING	35	46	Ethylenediamine	AR500ml	SHANGLING	330
47	Potassium dichromate	AR500g	SHANGLING	600					

Prices are for reference only and subject to change with market procurement prices. The price apportioned to the laboratory project number equals the purchase price.

Other supplies available for requisition: manual water pump, funnel, 25L plastic waste barrel.

1. [Time and Location for Requisition] Every Tuesday and Thursday from 15:00 to 16:00. No service is available at other times. Outdoor hazardous chemical temporary storage cabinet on the west side of Building E, ground floor.
2. [Source of Funds] This is a required field and must be a central corporate project starting with Y or E, or operational funds. Project numbers starting with SY or ending with S are not accepted.
3. [Key Points] The signatures of the center director and project leader are required for the requisition of precursor chemicals or explosive hazardous chemicals. The signature of the project leader is required for the requisition of non-precursor chemicals or non-explosive chemical reagents. **Except for signatures, printing is mandatory; handwritten or altered entries are invalid.**
4. [Special Hazardous Chemicals] For ordering regularly stocked items or imported, niche, or special hazardous chemicals not found in the storeroom, please consult Qu Hanjin at the Office of Procurement. For additional hazardous chemical stock in the storeroom, please contact Zhang Xiaoyun.

- 1) Except for nitrates (such as sodium nitrate, potassium nitrate, and ammonium nitrate) and nitric acid, fuming nitric acid, other situations do not permit matching storage.
- 2) Inorganic oxidants cannot be stored with soft powdery combustibles (such as coal dust, coke powder, carbon black, sugar, starch, sawdust).